

Case 3305**TUBIFICIDAE Vejdovský, 1876 (Annelida, Clitellata): proposed precedence over NAIDIDAE Ehrenberg, 1828**

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Abstract. The purpose of this application, under Article 23.9.3 of the Code, is to conserve the usage of the family-group name TUBIFICIDAE Vejdovský, 1876 for a well known group of aquatic oligochaetous clitellates. Following recent molecular studies it has been concluded that NAIDIDAE Ehrenberg, 1828 is a phylogenetic member of the taxon previously referred to as TUBIFICIDAE, implying that these two names are synonyms. Both names have long been used by aquatic biologists as associated with two functionally separated groups of worms. The junior name TUBIFICIDAE, with the famous *Tubifex* worm as its type, has been used for about 800 benthic species, which are burrowing or living interstitially in various limnic and marine sediments. The senior name NAIDIDAE, on the other hand, has been referred to about 175 species, most of which are epibenthic or epiphytic in freshwater habitats. It is proposed that the family-group name TUBIFICIDAE be given precedence over NAIDIDAE.

Keywords. Nomenclature; taxonomy; Annelida; Oligochaeta; Clitellata; NAIDIDAE; TUBIFICIDAE; *Nais*; *Tubifex*; sludge worms.

1. Müller (1774, p. 20) established the generic name *Nais* for several species, including *Nais barbata* Müller, 1774 (p. 23), which was selected as the type by Sperber (1948, p. 102). Lamarck (1816, p. 224) established the generic name *Tubifex* for two species, including *Tubifex rivulorum* Lamarck, 1816 (p. 225) which was introduced by him as a replacement name for *Lumbricus tubifex* Müller, 1774 (p. 27) (referring to Müller, 1776), apparently to avoid the tautology of '*Tubifex tubifex*'. *Tubifex rivulorum* was referred to as the 'type species of the genus' by Beddard (1895, p. 243), but in subsequent literature the type species of *Tubifex* is often quoted as '*Lumbricus tubifex* Müller, 1774' (e.g. Reynolds & Cook, 1976) or '*Tubifex tubifex* (Müller, 1774)' (e.g. Chekanovskaya, 1962; Brinkhurst, 1963, 1971b; Holmquist, 1985).

2. Early vernacular names based on Müller's *Nais* were used by Bosc (1802, p. 31), who separated the worms later known as oligochaetes into 'Naïade' and 'Lombric', and by Cuvier (1817, pp. 528–530), who treated 'Naïdes' as a group within 'Les Lombrics'. However, it was Ehrenberg (1828) who first established a family-group name (NAIDINA) that is a 'latinized noun in the nominative plural form from the stem of an available generic name' (Article 11.7.1 of the Code). This is sufficient for considering Ehrenberg as the author of what later was to become the family NAIDIDAE. The latter form of the name was first used by Vejdovský (1876), although he did not explicitly refer to Ehrenberg's NAIDINA. Grube (1851, p. 101), on the other hand, called it 'Familie NAIDEA Ehrenb.'.

3. Later, Vejdovský (1884) introduced a new taxon name, (family) NAIDOMORPHA, to replace NAIDINA Ehrenberg as well as his own NAIDIDAE; he also gave references to other vernacular and latinized family-group names stemming from the generic name *Nais* that had been published earlier by various authors ('Naïdes part. Oersted' [=1842]; 'NAIDEA part. Grube' [=1851]; 'NAICIDAE part. d'Udekem' [=1855]; 'Naïdes part. Johnston' [=1865]). Thus, a posteriori he referred to his own NAIDIDAE as the same taxon as Ehrenberg's NAIDINA. For some time thereafter, the two names NAIDOMORPHA and NAIDIDAE were variably used by different authors, for largely the same group of oligochaetes. For instance, Benham (1890) and Michaelsen (1900) used NAIDIDAE, while others (e.g. Stieren, 1892; Beddard, 1895) preferred NAIDOMORPHA.

4. Vernacular names based on Lamarck's *Tubifex* were mentioned by d'Udekem (1855, pp. 541–548: 'Famille des Tubifex'; 1859, pp. 9–17: 'Famille des Tubifécidées').

5. Vejdovský (1876) established the latinized family name TUBIFICIDAE in the same publication as the one introducing NAIDIDAE. It was not clearly stated, but it is evident that he based his name on the genus *Tubifex*. In 1884, Vejdovský retained TUBIFICIDAE while he replaced NAIDIDAE by NAIDOMORPHA (see above), and TUBIFICIDAE has been in common use since then (e.g. Beddard, 1895; Michaelsen, 1900; and onwards).

6. NAIDIDAE has been regarded as a clitellate taxon with ancestral traits by some authors (e.g. Chekanovskaya, 1962; Omodeo, 1998), while others (e.g. Beddard, 1895; Stephenson, 1930; Brinkhurst, 1971a, 1982, 1994, 1999; Timm, 1981) have considered it as closely related to TUBIFICIDAE. However, regardless of its phylogenetic position, until recently NAIDIDAE has largely been regarded as a taxon separate from TUBIFICIDAE. One exception is Vaillant (1890), who treated TUBIFICINEA and NAIDINEA as two groups within the family NAIDIDAE.

7. Chekanovskaya (1962) proposed NAIDOMORPHA to be regarded as a taxon at the rank of an order, within which she recognized six different families, including NAIDIDAE and TUBIFICIDAE. This usage of NAIDOMORPHA sensu lato has been retained in some of the modern oligochaete literature (e.g. Kasprzak, 1984) but otherwise has not been widely accepted.

8. Throughout the 20th century, authorships of NAIDIDAE and TUBIFICIDAE were seldom mentioned in taxonomic publications, but Hrabě (1981) erroneously referred to them as NAIDIDAE Benham, 1890 and TUBIFICIDAE Vejdovský, 1884. Thus, the association of NAIDIDAE with Ehrenberg (1828) was largely unnoticed since the late 1800s, while Holmquist (1983) and Erséus et al. (2002) correctly indicated Vejdovský (1876) as the author of TUBIFICIDAE. Moreover, a subfamily name formed from the

stem of *Tubifex* was quoted as 'TUBIFICINAE Eisen, 1879', by Brinkhurst (1971b), and Holmquist (1983), and as 'TUBIFICINAE Eisen, 1885', by Hrabě (1981). However, although Eisen (1879) indeed was the first to define TUBIFICINI [sic] as a subfamily of TUBIFICIDAE, Vejdovský (1876) is the author of all family-group names based on *Tubifex* (Article 36.1 of the Code).

9. For over 100 years, NAIDIDAE and TUBIFICIDAE have consistently been regarded as two distinctly different groups of aquatic oligochaetes, a separation reflecting differences in morphology, behaviour and reproductive biology. The worms known as tubificids are common and often dominant infaunal elements (i.e. they are either burrowing or interstitial) in freshwater and marine sediments; and to date about 800 species have been described worldwide. They are well known not only to hydrobiologists but also to laymen, partly due to the use of tubificids ('*Tubifex* worms', or 'sludge worms') as pet fish food. Species of *Tubifex* and some other tubificids may occur in astonishingly high densities at organically polluted freshwater sites. Moreover, tubificids can attain a considerable size, e.g. *Branchiura sowerbyi* Beddard, 1892 may be up to 185 mm, *Tubifex tubifex* and *Limnodrilus grandisetosus* Nomura, 1932 up to 100 mm long (Chekanovskaya, 1962). A vast majority of tubificids reproduce sexually. The about 175 species hitherto regarded as NAIDIDAE, on the other hand, are characterized by traits deviating from those of most other aquatic oligochaetous clitellates. They are highly active animals, with an epibenthic or epiphytic lifestyle in freshwater or brackish water; some are capable of swimming, and some prey upon other microscopic invertebrates. Reproduction is predominantly asexual (by paratomic fission), and naidid specimens are often observed as chains of zooids; individuals with developed sexual organs are rare. The members of this group are on average smaller than the typical TUBIFICIDAE. A chain of individuals of some *Chaetogaster* spp. may be less than 1 mm long, and only rarely naidid chains are longer than 20 mm (Chekanovskaya, 1962). Thus, the name TUBIFICIDAE has been used to denote a worm group that is more conspicuous than, and at least four times as species-rich, as the group hitherto defined as NAIDIDAE.

10. Various morphological and molecular data now support that NAIDIDAE has evolved within the group earlier defined as TUBIFICIDAE (Brinkhurst, 1994; Christensen & Theisen, 1998; Erséus, 1990; Erséus et al., 2000, 2002), implying that these two families should be considered as synonyms. Erséus & Gustavsson (2002) recently suggested that treating the former NAIDIDAE as a subfamily (NAIDINAE) within TUBIFICIDAE would best promote stability in the classification of these clitellate worms. By such an action, all species formerly recognized as TUBIFICIDAE would still be classified as such, and all species formerly known as NAIDIDAE would still be attributed to a taxon, the name of which is based on the stem of *Nais*, albeit at a lower rank. However, as the family-group name NAIDIDAE is older than the family-group name TUBIFICIDAE, the Principle of Priority stipulates that all former members of TUBIFICIDAE should rather be regarded as part of NAIDIDAE. This means that a great majority of the species of the former TUBIFICIDAE would lose their association with a family-group name based on *Tubifex*, and only the about 200 members of the taxon at present defined as the subfamily TUBIFICINAE would retain this association. That is, about 600 species (comprising the current tubificid subfamilies TELMATODRILINAE Eisen, 1879, RHYACODRILINAE Hrabě, 1963, PHALLODRILINAE Brinkhurst, 1971b, and

LIMNODRILOIDINAE Erséus, 1982; see Erséus, 1990) would become subordinates of NAIDIDAE.

11. The International Commission on Zoological Nomenclature is accordingly asked:

- (1) to use its plenary power to rule that the family-group name TUBIFICIDAE Vejdovský, 1876 and other family-group names based on *Tubifex* Lamarck, 1816 are to be given precedence over NAIDIDAE Ehrenberg, 1828 and other family-group names based on *Nais* Müller, 1774, whenever their type genera are placed in the same family-group taxon;
- (2) to place on the Official List of Generic Names in Zoology the following names:
 - (a) *Tubifex* Lamarck, 1816 (gender: masculine), type species by subsequent designation by Beddard (1895) *Lumbricus tubifex* Müller, 1774 (senior objective synonym of *Tubifex rivulorum* Lamarck, 1816);
 - (b) *Nais* Müller, 1774 (gender: feminine), type species by subsequent designation by Sperber (1948) *Nais barbata* Müller, 1774;
- (3) to place on the Official List of Specific Names in Zoology the following names:
 - (a) *tubifex* Müller, 1774, as published in the binomen *Lumbricus tubifex* (specific name of the type species of *Tubifex* Lamarck, 1816);
 - (b) *barbata* Müller, 1774, as published in the binomen *Nais barbata* (specific name of the type species of *Nais* Müller, 1774);
- (4) to place on the Official List of Family-Group Names in Zoology the following names:
 - (a) TUBIFICIDAE Vejdovský, 1876 (type genus *Tubifex* Lamarck, 1816), with the endorsement that it and other family-group names based on *Tubifex* are to be given precedence over NAIDIDAE Ehrenberg, 1828 and other family-group names based on *Nais* Müller, 1774 whenever their type genera are placed in the same family-group taxon;
 - (b) NAIDIDAE Ehrenberg, 1828 (type genus *Nais* Müller, 1774), with the endorsement that it and other family-group names based on *Nais* are not to be given priority over TUBIFICIDAE Vejdovský, 1876 and other family-group names based on *Tubifex* Lamarck, 1816 whenever their type genera are placed in the same family-group taxon.

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